

Description of a New Lutjanid Fish of the Genus *Paracaesio* from Japan

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At least three species of lutjanid fishes of the genus *Paracaesio* are taken commercially off the Pacific coast of southern Japan*. They are all prized as food, and shipped to the Central Wholesale Market of Tokyo in considerable quantity (usually one to five metric tons per day). It is remarkable to note that one of them, though well recognized at least by experienced middlemen at this market, seems not to have been described. In view of the progress of the survey of the marketable fishes of the islands lying south of Tokyo, it is thought timely to describe this new species here. The present writer takes pleasure in expressing here his sincere thanks to Prof. S. SHINOHARA (Ryukyu University, Okinawa Island) and Mr. T. KUSAKARI (Hachijō Branch, Tokyo Prefectural Fisheries Experiment Station, Hachijō Island) for their co-operation with him.

*Paracaesio kusakarii*** , new species

“Shima†-aodai††”, new Japanese name

Holotype.—Cat. No. 51, 906, Zoological Institute, Faculty of Science, University of Tokyo (=Cat. No. ABE '60-551). Purchased at the Central Wholesale Market of Tokyo on June 20, 1950. Undoubtedly fished by hook and line from the sea south of Tokyo and probably near Hachijō Island. Total length 344 mm., fork length 317 mm. and standard length (from snout tip to the hind end of the vertebral column; the latter having been exposed after the counting of the number of scales) 270 mm. The measurements were taken prior to preservation in isopropyl alcohol.

Paratypes.—Cat. No. 51, 907, Zoological Institute, Faculty of Science, University of

* South of the Cape of Inubo (near the estuary of the Tone). The northern and southern piscifaunal areas along the Pacific coasts of Japan was well defined by Dr. S. TANAKA (TANAKA, 1931).

** Named after Mr. T. KUSAKARI who has continued to co-operate with the present writer for the past eight years.

† Means striped or banded.

†† Means *Paracaesio caeruleus* (KATAYAMA); “ao” means blue, and “dai” is the same as “tai”, namely, sea bream or porgy *Chrysophrys major* TEMMINCK & SCHLEGEL.

Tokyo (=Cat. No. ABE '60-885). Purchased at the same market as above on September 5, 1960. Undoubtedly fished by hook and line from the sea south of Tokyo. Total length 400 mm., fork length 375 mm., standard length 323 mm. and weight 1065 g. (prior to boiling). Gonads attenuated. Skeletonized.

Cat. No. 51,908, Zoological Institute, Faculty of Science, University of Tokyo (=Cat. No. ABE '60-887). Purchased at the same market as above on September 14, 1960. Undoubtedly fished by hook and line from the sea south of Tokyo. Total length 400 mm., fork length 375 mm., standard length 310 mm. and weight 1000 g. (prior to boiling). Gonads attenuated; probably male. Skeletonized.

Proportional dimensions, expressed in percentages of standard length, of the holotype (measurements made while fresh).—Greatest depth of body 39.4, greatest breadth of body 17.3, least depth of caudal peduncle 11.5, length of head 29.6, horizontal diameter of orbit 7.5 (left) and 7.6 (right), vertical diameter of orbit 7.1 (on either side), length of snout 8.5 (on either side), bony interorbital breadth above eye-centers 10.7, greatest length of upper jaw *ca.* 10.4, greatest depth of maxillary 3.7 (left) and 3.5 (right), least depth of preorbital 2.4 (left) and 2.6 (right), length of dorsal spines (from 1st to 6th) 6.1, 9.6, 12.6, 13.0, 13.0, 12.0, length of 1st dorsal soft fin-ray 12.2, length of longest (antepenultimate) dorsal soft fin-ray 14.1, length of penultimate dorsal soft fin-ray 13.0, length of foremost branch of hindmost dorsal soft fin-ray 10.0, length of hindmost branch of the same fin-ray 7.4, length of anal spines (from 1st to 3rd) 5.0, 8.0, 9.4, length of 1st anal soft fin-ray 11.6, length of longest (antepenultimate) anal soft fin-ray 12.0, length of penultimate anal soft fin-ray 11.8, length of foremost branch of hindmost anal soft fin-ray 10.1, length of hindmost branch of the same fin-ray 7.8, length of ventral spine 14.4 (left) and 14.6 (right), length of longest (outermost) ventral fin-ray 20.4 on either side, length of longest (5th from top) pectoral fin-ray 30.4 on either side, length of 6th pectoral fin-ray 22.6 (left) and 21.8 (right), length of longest gill-rakers (uppermost 2 rakers of lower limb and the raker just at the junction of upper and lower limbs) 3.7 (left).

General appearance of the holotype.—The body is deep and moderately compressed. The interorbital area is convex, and the nape is elevated. The eyes are of moderate size, the horizontal diameter being slightly larger than 1/2 of the horizontal length of the postocular part of the head. The mouth is oblique, the lower jaw projecting beyond the upper. The nostrils on either side of the snout are placed fairly close together, and the anterior nostril has a triangular cutaneous flap at the hind margin. The maxillary is exposed posteriorly, and reaches just the vertical through the anterior margin of the eye. The maxillary, cheek, suboperculum, interoperculum and operculum are scaled. The snout, orbital rim and the anterior half of the interorbital area are naked. The temporal scales are separated posteriorly and postero-ventrally by naked area from the scaly areas of the back and operculum. The operculum is provided with two spines, the upper one being very weak. The preoperculum is finely serrated.

The caudal fin is forked. The pectoral fin is long, nearly reaching the vertical through the anal origin. The ventral fin is fairly long, nearly reaching the vent. The dorsal and anal fins are of moderate height; the hindmost soft fin-rays are not produced conspicuously. The innermost fin-ray of the ventral fin is connected with the belly by membrane, and the interpelvic process is very short and broad. The axillary scale over the ventral fin is fairly small, reaching posteriorly the base of the innermost fin-ray. The dorsal and anal fins are each received in a groove, which is deeper anteriorly below the spines of each fin. The pectoral and caudal fins are scaled proximally.

The lateral line is nearly parallel to the dorsal contour of the body, and extended over the proximal part of the caudal fin for a short distance. The scaled areas above and below the end of the lateral line reach farther rearwards.

The color in isopropyl alcohol is light brownish gray on back, with 4 dark nearly vertical bands, and dark brown on the dorsal part of the head; the flank, belly and the ventral part are silvery bearing brownish tint. The broken lines along the longitudinal scale rows are very conspicuous below the lateral line. The unpaired fins are all dark gray, with blackish parts. The paired fins are lighter. While fresh, the ground color of the back is bluish gray, and the vertical bands are brownish. The caudal fin is yellowish around the central part, leaving the upper and lower lobes light bluish gray. The dorsal fin has greenish tint anteriorly, and yellowish tint posteriorly. The anal fin has also yellowish tint. The pectoral and ventral fins are light pinkish, or may be said transparent. Speaking generally, the color while fresh is not so blue as in the close ally, *Paracaesio caeruleus*.

Fin-formulae of the holotype.—D. X 10 (all soft fin-rays branched; last fin-ray bifid to base). A. III 8 (all soft fin-rays branched; last fin-ray bifid to base). P. 16 (=ii+12+ii); 6th fin-ray from top much shorter than 5th on either side. V. I 5 (all soft fin-rays branched). C. 8/7 (branched fin-rays alone have been counted; for unbranched and rudimentary fin-rays, see accounts of paratypes which have been skeletonized).

Scales of the holotype.—The scales are minutely ctenoid, and arranged regularly. The broken lines parallel to the lateral line well show the longitudinal rows of scales. The number of these broken lines from below the lateral line down to the line just above the hind end on the anal base is 8 on either side. The number of the pored scales on the lateral line is 49 on either side. The number of the scales in an oblique row from the dorsal origin down and rearwards to the scale just above the lateral is $1/2$ 9 (left) and $1/2$ 10 (right); the number of the scales in the similar rows below the 5th dorsal spine is $1/2$ 7 on either side. The number of the scales in an oblique row from the anal origin up and forwards to the scale just below the lateral line is *ca.* 17 on either side. The number of the predorsal scales along the mid-dorsal line is *ca.* 18; the posterior scales are smaller and arranged irregularly. The scales below the eye are arranged in curved rows nearly following the postero-ventral curvature of the orbit;

the number of these rows is 7 (the hindmost row consisting of a few scales) (left) and 6 (right). The nearly vertical scale rows on the operculum number *ca.* 6. The scales on the suboperculum and interoperculum are smaller than those of the operculum. The number of the temporal scales is *ca.* 16 on either side.

Branchiostegals, pseudobranchiae, gills and gill-rakers of the holotype.—The branchiostegal membrane on one side seems not to lap over the partner of the other side. The number of the branchiostegals is 7 on either side. The pseudobranchiae are well developed. The gills are 4 in number on either side, and there is a slit behind the 4th gill; the length of the slit is less than the eye-diameter. The number of the gill-rakers on the anterior margin of the slit is 8 on either side. The gill-rakers on the 1st arch is of moderate length and number 10+1+8 on either side.

Teeth, tongue and isthmus of the holotype.—Teeth are present on the jaws, palatines and vomer; the tongue is edentate. The upper jaw has a narrow band of villiform teeth and an outer row of larger, canine-like teeth, of which the foremost 3 (left) and 1 (right) are the largest. The lower jaw bears a band of villiform teeth which tapers laterally and ends posteriorly in a row of a few fairly large canine-like teeth; besides, there is anteriorly an outer row of canine-like teeth. The vomerine teeth are villiform, few in number, and arranged in a small v-shaped patch which is convex anteriorly. The palatine teeth are also villiform, forming a narrow row.

The tongue is nearly triangular in shape, and of moderate width.

The isthmus is high, strongly compressed and naked anteriorly.

Some of the viscera of the holotype.—The stomach was inverted when it was purchased. There are many papillae on its surface. In order to count the number of the pyloric caeca, the stomach has been palced in the proper position. The numbe of the caeca just mentioned is not exactly known of the present specimen; they have been deformed by autolysis. It is, however, certain that it is very small. For this number, readers are requested to see the notes on the paratypes which follow. The air-bladder is simple and very large, reaching posteriorly far beyond the vent.

Notes on the paratypes.—In the following account, figures and words pertaining to the specimen collected later, namely, Cat. No. 51, 808, are given in italics and parenthesized. Greatest depth of body 39.4 (39.4) % of standard length, greatest width of body 18.9% of standard length.

D. X 10 (all soft fin-rays branched; last fin-ray bifid to base) in either paratype.

A. III 8 (all soft fin-rays branched; last fin-ray bifid to base) in either paratype.

P. 16 (=ii+12+ii on either side) (16=ii+13+i, *left*; 16=ii+12+ii, *right*). 5th fin-ray from top is the longest on either side in either paratype.

V. I 5 (all soft fin-rays branched; innermost fin-ray connected by membrane with belly) in either paratype.

C. xi 8/7 xi (xii 8/7 x; each half of lowermost 2 rudimentary rays bifurcate).

Total number of vertebrae 24=10+14 in either paratype.

Number of proximal segments of dorsal radials (interneurons) 21+1; the foremost

3 bear no dorsal spine; the last one short and flattened. Number of distal segments of dorsal radial 8 (for spines)+10 (for soft fin-rays). Number of middle segments of dorsal radials 7; they are each connected with a proximal segment (from the 15th to the 21st). In both specimens, the structure of the dorsal fin-supports is the same.

Number of proximal segments of anal radials (interhaemals) 9+1; the last one short and flattened. Number of distal segments of anal radials 1 (for spine)+8 (for soft fine-rays). Number of middle segments of anal radials 6; they are each connected with a proximal segment (from the 4th to the 9th). In both specimens, the structure of the anal fin-supports is the same.

Scales are minutely ctenoid in both specimens. Number of pored scales along lateral line 50 (left) and 49 (right) (*48 on either side*). Number of scales in an oblique row from dorsal origin down and rearwards to the scale just above lateral line $1/2$ 9 (left) and $1/2$ 10 (right) (*$1/2$ 9 on either side*). Number of scales in an oblique row from anal origin up and forwards to the scale just below lateral line 17 (left) and $17 \frac{1}{2}$ (right) (*$16 \frac{1}{2}$ on either side*). Number of predorsal scales along mid-dorsal line $1/2$ 17 (17). Number of curved scale rows following curvature of postero-ventral margin of orbit 7 (left) (*7 on left side and 6 on right side*). Number of temporal scales *ca.* 13 (left) and 18 (right) (*17 arranged in *ca.* 3 rows on either side*).

In both specimens pseudobranchiae well developed; gills 4; a slit behind the 4th gill. Number of branchiostegals 7 on either side in both specimens. Number of gill-rakers 10+1+18 (left) and 11+1+18 (right) (*10+1+18 on either side*).

Number of pyloric caeca 5 in both specimens. Air-bladder simple, very large, and extended posteriorly beyond vent; muscles on either side of air-bladder fairly well developed in both specimens. The inside of the stomach bears many papillae in both specimens.

The skull well resembles that of *Paracaesio caeruleus*, but the supraoccipital crest is higher, and the antero-ventral corner is rounded in the two paratypes of the present new species. The subocular shelf is very well developed in both specimens. There is no supramaxillary in both specimens.

The coloration of the two paratypes were similar to the holotype. If seen at certain angle, the posetrior part of the side of the body was blue in the paratypes; this color resembled the blue of *caeruleus*.

Distinctive characters and relationships.—The present new species resembles *Paracaesio caeruleus* (KATAYAMA) very closely, but differs from the latter in the presence of scales on the maxillary and dark vertical bands on back, and in the shape of the supraoccipital; this bone is higher and rounded at the antero-ventral corner in the former, while in *caeruleus* the ventral margin of the supraoccipital is nearly straight to the anterior end of the bone.

Paracaesio xanthurus (BLEEKER) and *Paracaesio cantharoides* (BARNARD) are also related fairly closely to the present new species, but in the former two species the body is less deep, the back is yellow and the number of scales along the lateral line is

much higher than in the latter. Dorsal spines in *xanthurus* are much weaker than in *caeruleus* and *kusakarii*. The statement by Dr. J. L. B. SMITH (1949, p. 252) that "maxilla usually scaly" in the genus *Aetiasis* (erected by Dr. BARNARD taking *cantharoides* as type) is of special interest. The present writer has examined the maxillary of the three Japanese species of *Paracaesio* at the Central Wholesale Market of Tokyo, and seen that scales are always absent there in *caeruleus* and *xanthurus* (of Japan), and that scales always exist there in the present new species.

The present writer agrees with Dr. MATSUBARA in placing the genus *Paracaesio* in the family Lutjanidae in broader sense (MATSUBARA, 1955, p. 659), and, thanks to the account given by Prof. SMITH based on intact specimens, confirms Dr. MATSUBARA's suggestion that *Aetiasis* is a synonym of *Paracaesio*, BLEEKER.

Dr. KATAYAMA's statement (KATAYAMA, 1934, p. 436) that the skull of *Paracaesio* is nearer to *Parastipoma* than it is to *Caesio* is also very suggestive. In general appearance, the members of *Paracaesio* resemble *Parastipoma trilineatum* (THUNBERG), but the latter has weaker dorsal spines, much smaller scales, no teeth on the vomer and palatines, no subocular shelf, and more vertebrae (27).

Remarks.—It is highly probable that the fish called "Shiro-aoze" (meaning white* form of *Paracaesio caeruleus*) in Hachijō Island is the present new species. If so, according to Mr. KUSAKARI, it is often caught off Koiwado and off Ishizumi (both in Hachijō Island), and not commonly met with at the other fishing grounds near the island. At the bank of "Kurose", north-east of Hachijō Island, it is very rare. The maximum size attained is larger for the new species than for *caeruleus*, the former reaching 4 kg in weight, but usually the individuals of the new species caught by hook and line are rather small, weighing some 200 to 300 g. At the Central Wholesale Market of Tokyo, the number of individuals of the new species handled almost every day is some 10% or less (rarely 100% or more) of *caeruleus*. This is nearly in line with the information given by Mr. KUSAKARI that "Shiro-aoze" is met with in small number when the catch of *caeruleus* is good and that the former rarely appears when the catch of the latter is small.

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* As faded individuals of *caeruleus* appear not infrequently at markets, the adjective "shiro" (white) seems not to be convenient for fishmongers or biologists to denote the present new species.

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